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Hunt induced mortality in Northwest Atlantic Hooded Seals

Mortalité causée par la chasse chez les phoques à capuchon de l'Atlantique Nord-Ouest

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Abstract

Information on catch levels and age structure of removals are necessary for accurate population estimation and responsible management of Northwest Atlantic hooded seals (Cystophora cristata). Seals are killed during a subsistence harvest in Greenland and a commercial hunt in southern Canadian waters. In addition to the reported catches, seals are also killed but not recovered ('struck and lost'). The objective of this report is to summarize the available data on reported catches of hooded seals and to estimate total hunt-induced mortality of hooded seals for the years 1954 – 2006. Prior to the imposition of quotas in 1974, Canadian catches were highly variable, ranging from a couple of hundred to more than 25,000. Between 1974 and 1982 catches averaged 12,500 (SD=2,000) but as a result of a collapse in the major markets, catches declined after 1982. With the exception of 1 year, annual catches were in the range of a few hundred until the mid 1990s. In 1996 a large number of bluebacks were taken illegally while a subsidy for meat resulted in catches of over 7,000 in 1997 and 10,000 in 1998. Since then, the annual harvests of hooded seals in Canadian waters have remained low. Between 1945 and 1960 moulting hooded seals were hunted by Norwegian vessels in the Denmark Strait. Annual catches ranged from 1,500 - 48,000 and averaged 14,500 (SD = 10,800). Less than 1,000 seals were taken by Norwegian scientists biennially between 1970 and 1978. Catches in Greenland were between 1,000 and 2,000 between the mid 1950s and 1972 (mean = 1,600, SD = 600). Since then catches have ranged from 3,000 - 10,000, being in the 6,000 – 7,000 range in most years. Total removals averaged 34,800 (SD = 10,200) seals between 1954 and 1960. Throughout the 1960s annual catches varied greatly. From 1974 - 1982, hooded seals catches were relatively steady averaging 24,600 (SD = 2,000). With the exception of three years (1996-98), catches have averaged 8,100 (SD = 1,900) since 1982. The majority of hooded seals are caught in Greenland. With the exception of the 1963-1982 period when Canadian catches accounted for over 70% of the annual catches, Greenland accounted for over 65% of the hooded seals killed. The proportion of young in the harvest has remained consistent with approximately 30% being young of the year. Extremely low numbers of hooded seals are killed in the Canadian Arctic or as bycatch in commercial fisheries.

Résumé

Nous devons recueillir des données sur les niveaux de prélèvement et la structure par âge des animaux capturés si nous voulons effectuer une estimation précise de la population ainsi qu'une gestion responsable des phoques à capuchon de l'Atlantique Nord-Ouest (Cystophora cristata). Les phoques sont tués dans le cadre de la chasse de subsistance pratiquée au Groenland et de la chasse commerciale qui a cours dans les eaux du sud du Canada. En plus des prélèvements déclarés, certains phoques sont également tués, mais non récupérés (perdus). L'objectif du présent rapport est de résumer les données disponibles sur les prélèvements de phoques à capuchon déclarés et d'estimer les taux de mortalité totaux attribuables à la chasse chez cette espèce entre 1954 et 2006. Avant l'imposition des quotas en 1974, les prélèvements canadiens étaient très variables, s'étendant de quelques centaines d'individus à plus de 25 000. Entre 1974 et 1982, les prélèvements ont atteint une moyenne de 12 500 phoques (écart-type = 2000). Toutefois, en raison d'un effondrement des principaux marchés, les prélèvements ont chuté après 1982. À l'exception d'une année, les prélèvements annuels ont été de l'ordre de quelques centaines d'animaux jusqu'au milieu des années 1990. En 1996, un grand nombre de dos bleus ont été capturés illégalement, tandis qu'une subvention pour la viande a entraîné des captures de plus de 7000 animaux en 1997 et de 10 000 animaux en 1998. Depuis, les prélèvements annuels de phoques à capuchon dans les eaux canadiennes sont demeurées faibles. Entre 1945 et 1960, des phoques à capuchon en mue ont été chassés par des navires norvégiens dans le détroit du Danemark. Les prélèvements annuels ont varié de 1500 à 48 000 individus et ont atteint une moyenne de 14 500 phoques (écart-type = 10 800). par Entre 1970 et 1978, moins de 1000 phoques ont été capturés par deux ans par des scientifiques norvégiens. Entre le milieu des années 1950 et 1972, les prélèvements effectués au Groenland se sont situés entre 1000 et 2000 individus (moyenne = 1600; écart-type = 600). Depuis, les captures se sont chiffrées à de 3000 à 10 000 individus – entre 6000 et 7000 animaux la plupart des années. Entre 1954 et 1960, les prélèvements moyens ont été de 34 800 phoques (écart-type = 10 200). Au cours des années 1960, les prélèvements annuels ont varié considérablement. De 1974 à 1982, les prélèvements de phoques à capuchon ont été relativement stables, atteignant une moyenne de 24 600 individus (écart-type = 2000). À l'exception de trois années (de 1996 à 1998), les prélèvements ont été en moyenne de 8100 individus (écart-type = 1900) depuis 1982. La majorité des phoques à capuchon ont été capturés au Groenland. À l'exception de la période s'étendant de 1963 à 1982, durant laquelle les prélèvements canadiens ont représenté plus de 70 % des captures annuelles, le Groenland a tué plus de 65 % des phoques à capuchon. La proportion de jeunes dans les prélèvements est demeurée stable, environ 30 % étant des jeunes de l'année. Un nombre de phoques à capuchon extrêmement faible est tué dans l'Arctique canadien ou est prélevé en tant que capture accidentelle dans le cadre des pêches commerciales.

Introduction

In order to determine abundance of wild populations accurately it is necessary to obtain the most complete data possible on the level of human induced mortality. This is particularly important for species that are exploited by subsistence or commercial hunts. In the Northwest Atlantic, hooded seals (*Cystophora cristata*) are hunted throughout their range and thus are subject to catches in both Canada and Greenland.

Northwest Atlantic hooded seals whelp on the pack ice off Newfoundland, in the southern Gulf of St. Lawrence and in the Davis Strait (Sergeant 1974, Hammill et al. 1992, Stenson et al 1997, Stenson et al. 2006). After breeding, adult seals disperse to the Laurentian Channel or to the slope edges of the Grand Banks, Flemish Cap and/or Reykjanes Ridge to feed (Stenson et al this meeting, Stenson, Hammill and Rosing-Asvid unpublished data). In June or early July, seals from all three whelping areas migrate to southeast Greenland where they moult (Stenson and Sjare 1996).Following the moult, most of the adult seals appear to disperse along the coast of Greenland into the Labrador Sea and Baffin Bay where they feed before migrating to the whelping areas (Stenson, Hammill and Rosing-Asvid unpublished data). Less is known about the movements of young and juvenile hooded seals but the majority appear to remain in Greenland waters throughout the year.

Seals are subject to a number of sources of mortality. Like harp seals, hooded seals are hunted commercially in Atlantic Canada and for subsistence purposes in Greenland. However, unlike harps, very few hooded seals are taken in the Canadian Arctic or as bycatch in Canadian fisheries (Anon 2005; B. Sjare pers. com).

Catches of hooded seals in Canada and Greenland have been summarized in the reports of the Joint ICES/NAFO Working Group on Harp and Hooded Seals (Anon 1998, 1999, 2004, 2006). Some data on the age structure of historical catches are available. The age structure of Canadian commercial catches prior to the 1980s are presented in Øritsland and Benjaminsen (1975), Sergeant (1976), Lett (1977), and Winters and Bergflodt (1978). Kapel (1975, 1981, 1983) provides data on the ages of hooded seals taken in Greenland.

In addition to reported catches, during any hunt some animals are killed, but not recovered and therefore, not included in the catch statistics. This is referred to as 'struck and lost'. The proportion of seals that are lost will depend upon the hunting method, skill of the hunter, location (e.g. on ice or in the water), weather conditions, age and condition of the seal, and the time of year (which is correlated with the thickness of the blubber layer in seals that lay down seasonal energy reserves) (Sergeant 1991, Lavigne 1999). Unfortunately, few data are available on the level of struck and lost in pelagic seals and most of it was colleted before 1980. Lavigne (1999) reviewed available data on loss rates in older seals while Rowsell (1977) provided some data on loss rates for young harp seals (beaters) taken on the ice. Sjare and Stenson (2002) estimated struck and loss rates in the Canadian commercial harp seal hunt between 1998 and 1999. There are no data available on struck and lost among hooded seals.

The objective of this study is to compile and update available estimates of Canadian and Greenland catches and struck and lost of hooded seals up to, and including 2006, to produce an estimate of hunt induced mortality in northwest Atlantic hooded seals.

Data and Discussion

Struck and Lost

In 1999 the National Marine Mammal Peer Review Committee reviewed the available information on the proportion of seals that are killed but not recovered (DFO 1999). They concluded that specifically accounting for mortalities associated with struck and lost is more informative than including them as part of an aggregate natural mortality. However, there are limited data on which to base estimates, particularly in northern areas, and no data for hooded seals. The same committee reviewed additional data (Sjare and Stenson 2002) the following year and agreed that the level recommended previously for harp seals be retained (DFO 2000).

As there are no data for hooded seals which are hunted using techniques similar to those of harps, I have assumed struck and lost rates similar to those used for harp seals (Stenson 2005). For young of the year seals killed in southern Canadian waters on the whelping ice (i.e. prior to the end of the large vessel hunt in 1982), it is assumed that 99% of the animals were recovered. Because the older seals taken prior to 1983 were likely breeding seals taken on the whelping ice (see below), a recovery rate of 99% was also assumed. From 1983 onward, it was assumed that 95% of the young of the year were recovered while the recovery rate for seals one year of age and older taken in southern Canadian waters was 50%. In the absence of data, a recovery rate of 50% was applied to all seals taken in Greenland and the Denmark Strait (Table 1). This is consistent with that used for harp seals.

Commercial and Subsistence Catches

Hooded seals are hunted in two main areas of the Northwest Atlantic. In Canadian waters, hooded seals were historically caught in southern Canadian waters near the whelping areas off southern Labrador and/or the Northeast coast of Newfoundland ('the Front' - NAFO Div. 2J and 3KL), and in the Gulf of St. Lawrence ('the Gulf' - NAFO Div. 4STVn). This population is also harvested off western and southeastern Greenland (NAFO Div. 1A-F; ICES Area XIVb). Reported catches for each of these areas are summarized in Table 2 and illustrated in Fig 1.

Front and Gulf

Prior to 1964 hooded seals were hunted in both the Front and Gulf areas. In 1964, however, hunting was banned in the Gulf (Table 3). Total catch at the Front and in the Gulf for the years 1946-78 were compiled from values reported in the Statistical Bulletin of the International Commission for Northwest Atlantic Fisheries (ICNAF 1970-77). Subsequent corrections were noted (ICNAF Statistical Bulletins 1985a, b). Catches for the years 1979-89 were compiled from values reported in the Statistical Bulletin of the Northwest Atlantic Fisheries Organization (NAFO 1984-94). Total catches at the Front for the years 1989-2006 were provided by DFO Statistics Branch. DFO research catches from both Newfoundland and the Gulf were added to the reported catches. As a result, the catches reported here may differ slightly from those reported by DFO Statistics Branch.

Prior to the imposition of quotas in 1974, Canadian catches were highly variable, ranging from 181 to more than 25,000 (average 8,000; SD=6,100; Table 2). Between 1974 and 1982, an allowable catch (TAC) of 15,000 (Table 2) resulted in an average catch of 12,500 (SD=2,000). Due to poor markets resulting from an import ban on young hooded seals ('bluebacks') to the European Economic Community, hooded seal catches declined after 1982 and changes in the Canadian Marine Mammal Regulations banned the commercial catch of bluebacks in 1987 (Table 3). With the exception of 1991, when over 6,000 were taken, annual catches were in the range of a few hundred until the mid 1990s. In 1996 a large number of bluebacks were taken illegally while a subsidy for meat resulted in 7,000 and 10,000 older seals being harvested in 1997 and 1998, respectively. Since then the annual harvest of hooded seals in Canadian waters has numbered only a few hundred with less than 50 taken in the past two years (Table 2).

With few exceptions, catch statistics provided by ICNAF, NAFO and DFO Statistical Branch are reported according to pelage type. Based upon these reports, Canadian catches can be split into young of the year (age class 0) and seals one year of age and greater (1+) (see Table 2). The numbers of 0 age-class seals taken annually were obtained directly from these data. Between 1990 and 1996, however, the age class of the catches was not provided. It was assumed that, with the exception of 1996, catches were of 1+ seals as it was illegal to take bluebacks. In 1996, an illegal hunt of bluebacks occurred. The majority of the very large catch taken in this year (>25,000) were considered to be bluebacks based upon court records and reports from Fishery Officers.

Prior to the mid 1970s, relatively large numbers of adult seals were taken in some years. Based on reports from sealers, it was assumed that these seals were primarily taken on the whelping grounds in order to obtain access to the pups. Although fewer adults were taken during the 1970s due to restrictions on the proportion of adults allowed in the catch, it is likely that they were also breeding adults. The age structure of adult seals taken during March from 1979-1982 obtained during research carried out by DFO was used to estimate the proportion of 1+ animals in the catch prior to 1983 (Table 4).

However, due to the small annual sample sizes, the data were combined and applied to all years.

Following the closure of the large vessel hunt in 1982, hooded seals were no longer taken on the whelping ice. To reflect this change in hunting, samples of hooded seals taken by sealers in Newfoundland and Labrador during all winter months from 1983 – 2005 were used to estimate the age structure of 1+ seals after 1982 (Table 4). Again, due to the small numbers of seals sampled in any single year, the data for all years were combined. Prior to 1982 few seals less than 4 years of age were taken. This reflects the age of the breeding animals. After 1982, however, a wider range of ages are seen with younger seals being more common.

The estimated number of seals in each age class caught in the Canadian commercial hunt 1946 - 2006 are presented in Table 5 and summarized in Fig. 2. The reported catches have been adjusted to account for the assumed levels of struck and lost.

Greenland

Greenland catches for the years from 1945 to 2003 were taken from Anon (2006). Greenland catches can be separated into two classes – Norwegian moulting catches and Greenland hunters (Table 2).

Norwegian catches

Between 1945 and 1960 moulting hooded seals were hunted by Norwegian vessels in the Denmark Strait. Annual catches ranged from 1,500 seals to almost 48,000 and averaged 14,500 (SD = 10,800) (Anon 1998, 1999, 2004, 2006). Norwegian scientists collected hooded seals biennially between 1970 and 1978. Less than 1,000 animals were taken in most years (mean = 880, SE = 360).

The age structure of Norwegian catches was estimated from samples collected by Norwegian scientists from the Norwegian Institute of Fisheries Research (Table 6, N. Øien, pers. comm.). Samples collected between 1955 and 1960 were combined and applied to catches from 1945 – 1960. Samples collected in 1970, 1972, 1974, 1976 and 1978 were applied to the scientific catches for the appropriate year. Few seals aged 0 or 1 appear to have been taken at the moulting areas. The largest sample sizes were from juveniles 2-6 years of age. Applying these age structures to the reported catches and adjusting for the assumed levels of struck and lost results in the catches at age presented in Table 7 and Fig. 3.

Greenland catches

The reported catches in Greenland between 1954 and 2006 (Anon 1998, 1999, 2004, 2006) are presented in Table 2. These catches include some seals taken on the moulting grounds from 1959 through 1968. Since the late 19th century catch statistics for

Greenland were obtained through a reporting system known as the "Hunters' List-of-Game" (Kapel and Rosing-Asvid 1996). However, in 1987 this reporting system was discontinued. In 1993 a new reporting system (known as "Pininarneq") began and has provided estimates of catches from 1993-2003. No catch statistics are available in the time period for which there was no reporting system (1988-92). Kapel and Rosing-Asvid (1996) and Rosing-Asvid (1997) compared the two systems of reporting and concluded that they provided comparable data on catches. Catches from 1988 – 1992 were estimated from a linear regression of catches from the 5 years before (1985-89) and following (1993-97) this change.

Rosing-Asvid (1997) corrected reported harp seal catches from 1975-95 due to under-reporting in some communities and among part-time hunters. Adjustments to catches prior to 1975 were not applied since under-reporting was considered to be insignificant for this time period (Rosing-Asvid 1997). Although this correction factor was based on a study of harp seals and the communities that hunt hooded seals may differ, it was considered appropriate to apply a small correction factor (~5%) to the reported catches from 1993 – 2006 based upon the level of under-reporting observed in 1994 and 1995 (A. Rosing, Asvid, pers. com.).

Reported catches in Greenland after 2003 are not available. Given the relatively consistent level of hunting observed, I applied the average catch for the previous 10 years (1994-2003) to the final years (2004-2006).

Catches in Greenland were between 1,000 and 2,000 between the mid 1950s and 1972 (mean = 1,600, SD = 600). Since the mid 1970s annual catches in Greenland have fluctuated between 3,000 and 10,000 with the catches being in the 6,000 – 7,000 range in most years (Anon 2006). Between 1972 and 1987 catches averaged 5,400 (SD = 1,000) while from 1993 – 2003 an average of 6,400 (SD = 1,900) were taken.

Kapel (1975, 1981, 1983, pers. comm.) provided data on the age structure of hooded seal catches in Greenland. Data from all areas were combined to provide estimates of the annual age structure of catches from 1970 – 1985 and in 1991. Because samples sizes were generally small and the age structure was similar among years, samples were combined. Catches in 1985 and 1991 had a larger proportion of young of the year seals than the earlier samples. Therefore, the data were combined into two periods (Table 8). The age structure of samples collected between 1970 and 1984 was applied to catches prior to 1985. The age structure obtained from the 1985 and 1991 samples was applied to catches from 1985 – 2006. However, because the relatively few samples collected in 1985 and 1991 were taken mainly from southeast Greenland (Kapel, pers. comm.), I also present the age structure obtained by combining all years.

The estimated numbers of seals taken in each age class by Greenland hunters from 1954-2006 and corrected for the proportion of seals recovered are given in Table 9 and Fig. 4. This table assumed that the proportion of young seals in the catches increased after 1984. The catch at age assuming a single age structure of the entire period and correcting for struck and lost is presented in Table 10.

Total hunt induced removals

Data on catches from all three areas are available from 1954 onward. Combining the reported Canadian and Greenland catches with assumed levels of struck and lost provides an estimate of hunt induced mortality for Northwest Atlantic hooded seals (Table 11, Fig. 5).

Between 1954 and 1960 removals averaged 34,800 (SD = 10,200) seals, primarily due to catches of moulting seals in Greenland. Throughout the 1960s and early 1970s annual catches varied greatly. From 1974 through 1982, hooded seals catches were relatively steady averaging 24,600 (SD = 2,000). With the exception of three years (1996-98) catches have averaged 8,100(SD = 1,900) since 1982.

The majority of hooded seals have been caught in Greenland over the past 5 decades. Between 1954 and 1962 the annual percentage of catches that occurred in Greenland was 66%. From 1963 – 1982 Canadian (and Norwegian) sealers hunting off Newfoundland took and average of 72% of the annual catches. However, since the Canadian ban on the hunting of bluebacks, Greenland hunters have accounted for the majority of catches. With the exception of 1996-1998 when Canadian hunters took large numbers of hooded seals, catches in Greenland averaged 86% of the total annual catches.

The proportion of young of the year in the harvest has remained remarkably consistent over the time period these data represent. On average age class 0 seals account for 29.8% (SD = 12.2%) of the catches.

General Comments

The relatively low level of hooded seal catches and the dispersed nature of the Greenland hunt make it very difficult to obtain accurate estimates of age composition of the hooded seal removals. Also, given the importance of the Greenland hunt to the overall removals, assumptions about the proportion of seals recovered are critical. Currently, there are no data available on the level of struck and loss in Greenland. The assumption of 50% loss is highly controversial, but in the absence of data it is considered to be a conservative approach to estimating removals. Improving these estimates is critical for understanding hunting mortality of northwest Atlantic seals.

It was assumed that the method of hunting moulting hooded seals carried out in the Denmark Strait was similar to the open water hunts and a loose rate of 50% was applied. Sjare and Stenson (2002) report that loss rates of harp seals during DFO research collections were lower than 15%. If the Norwegian research cruises were carried out in a similar manner, hunting mortality may be overestimated. If so, this may affect subsequent estimates of total population in early years but would not likely affect current estimates significantly (Hammill and Stenson 2006)

I did not account for hooded seals taken by Inuit in the Canadian Arctic. Generally, local hunters report that few hoods are taken. In a harvest study carried out by the Nunavut Wildlife Board (Anon 2005) only a few communities reported hunting hooded seals. With one exception, catches were very low (usually 1-2 seals per year). However, in one instance a community reported taking over 200 seals in one year. This high catch was not repeated and further work is required to determine if this represents sporadic high catches or is due to an error in reporting. In any case, considering the level of catches in other areas, catches in the Canadian Arctic are unlikely to have an impact on population estimates derived from these data.

It was assumed that these data accurately reflect the levels of removals from each of these sources. Unfortunately, there are no estimates of the uncertainty associated with the reported catches or the level of struck and loss. These data should be examined closer and methods developed to estimate probable levels of misreporting. Similarly, the assumed levels of struck and lost should reflect the uncertainty associated with these multipliers.

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References

Anonymous. 1986. Seals and Sealing in Canada. Report to the Royal Commission, Volume 3. Minister of Supply and Services, Ottawa, Canada. P. 679.

Anonymous. 1998. Report of the Joint ICES/NAFO Working Group on Harp and Hooded Seals. ICES CM 1998/Assess:3.

Anonymous. 1999. Report of the Joint ICES/NAFO Working Group on Harp and Hooded Seals. ICES CM 1999/ACFM:7.

Anonymous. 2004. Report of the Joint ICES/NAFO Working Group on Harp and Hooded Seals. ICES CM 2004/ACFM:6.

Anonymous. 2005. The Nunavut Wildlife Harvest Study. Nunavut Wildlife Management Board. Iqaluit Nunavut.

Anonymous. 2006. Report of the Joint ICES/NAFO Working Group on Harp and Hooded Seals. ICES CM 2006/ACFM:6.

DFO. 1999. Proceeding of the National Marine mammal Review Committee Montreal, Quebec. DFO Can. Stock Assess. Proceed. Ser. 1999/14.

DFO. 2000. Proceedings of the national Marine Mammal review Committee harp seal review meeting. DFO Can. Stock. Assess. Proceed. Ser. 2000/05.

Hammill, M. O. and G. B. Stenson. 2006 Abundance of northwest Atlantic hooded seals (1960-2005). DFO Can. Sci. Advis. Sec. Res. Doc. 2006/068.

Hammill, M. O., G. Stenson, and R. A. Myers. 1992. Hooded seal pup production in the Gulf of St. Lawrence. Can. J. Fish. Aquat. Sci. 12:2546-2550.

ICNAF. 1970. Sealing statistics for 1937-68. ICNAF Stat. Bull. 18: 124-140.
1971. Sealing statistics for 1969. ICNAF Stat. Bull. 19: 119-120.
1972a. Sealing statistics for 1970. ICNAF Stat. Bull. 20: 109-110.
1972b. Sealing statistics for 1971. ICNAF Stat. Bull. 21: 133-134.
1974. Sealing statistics for 1972. ICNAF Stat. Bull. 22: 215-216.
1975. Sealing statistics for 1973. ICNAF Stat. Bull. 23: 241-242.
1976. Sealing statistics for 1974. ICNAF Stat. Bull. 24: 253-254.
1977. Sealing statistics for 1975. ICNAF Stat. Bull. 25: 229-230.
1977. Sealing statistics for 1976. ICNAF Stat. Bull. 26: 229-230.
1985a. Sealing statistics for 1977. ICNAF Stat. Bull. 27: 279-280. (Revised).
1985b. Sealing statistics for 1978. ICNAF Stat. Bull. 28: 293-294. (2nd Revision)

Kapel, F. O. 1975. Recent research on seals and seal hunting in Greenland. Rapp. P.-v. Réun. Cons. Int. Explor. Mer. 169:462-478.

Kapel, F. O. 1981. Studies on hooded seal in Greenland 1970-1080. NAFO SCR Doc. 81/XI/150.

Kapel, F. O. 1983. Additional information on the age composition of hooded seals caught in south Greenland 1975-1980. Unpublished manuscript.

Kapel, F. O. and A. Rosing-Asvid. 1996. Seal hunting statistics for Greenland 1993 and 1994, according to a new system of collecting information, compared to the previous Lists-of-Game. NAFO Sci. Coun. Studies. 26: 71-86.

Lavigne, D. M. 1999. Estimating total kill of northwest Atlantic harp seals, 1994-1998. Mar. Mamm. Sci. 15:871-878.

Lett, P. F. 1977. A model to determine stock size and management options for the Newfoundland hooded seal stock. CAFSAC Res. Doc. 1977/25, 19 p.

NAFO. 1984a. Sealing statistics for 1979. NAFO Stat. Bull. 29: 291-292. (Revised)
1984b. Sealing statistics for 1980. NAFO Stat. Bull. 30: 277-278. (Revised)
1984c. Sealing statistics for 1982. NAFO Stat. Bull. 32: 283-284.
1985a. Sealing statistics for 1981. NAFO Stat. Bull. 31: 275-276. (Revised)
1985b. Sealing statistics for 1983. NAFO Stat. Bull. 33: 277-278.
1986. Sealing statistics for 1984. NAFO Stat. Bull. 34: 303-304.
1987. Sealing statistics for 1985. NAFO Stat. Bull. 35: 319-320.
1989. Sealing statistics for 1986. NAFO Stat. Bull. 36: 303-304.
1990. Sealing statistics for 1987. NAFO Stat. Bull. 37: 293-294.
1991. Sealing statistics for 1988. NAFO Stat. Bull. 38: 303-304.
1993. Sealing statistics for 1989. NAFO Stat. Bull. 39: 297-298.
1994. Sealing statistics for 1990. NAFO Stat. Bull. 40: 307-308.

Øritsland, T., and T. Benjaminsen. 1975. Additional data on the sex ratio, age composition and mortality of Newfoundland hooded seals, with an estimate of pup production and sustainable yield. ICNAF Res. Doc., No. 122, Serial No. N3626, 22 p.

Rosing-Asvid, A. 1997. Catch numbers of harp seal in Greenland waters. Working paper SEA-86. Presented to the Joint ICES/NAFO Working Group on harp and hooded Seals, Copenhagen, Denmark, 28 Aug.-3 Sept., 1997.

Rowsell, H. C. 1977. Sealing activities by Newfoundland landsmen and ships on the Front. Report to the Committee on Seals and Sealing and the Canadian Federation of Humane Societies. 24pp. Available from the Department of Fisheries and Oceans, 200 Kent St. Ottawa, Ont. K1A 0E6.

Sergeant, D. E. 1974. A rediscovered whelping population of hooded seals, *Cystophora cristata* Erxleben and its possible relationships to other populations. Polarforschung 44:1-7.

Sergeant, D. E. 1976. Research on hooded seals *Cystophora cristata* Erxleben in 1976. ICNAF Res. Doc., No.126 (Revised), Serial No. N4012, 8 p.

Sjare, B. and G. B. Stenson. 2002. Estimating struck and loss rates for harp seals (*Pagophilus groenlandicus*) in the Northwest Atlantic. Mar. Mamm. Sci. 18:710-720.

Stenson, G. B. 2005. Estimates of human induced mortality in Northwest Atlantic harp seals, 1952-2004. DFO Can. Sci. Advis. Sec. Res. Doc. 2005/050.

Stenson, G. B. and B. Sjare. 1996. Newfoundland hooded seal tag returns in the Northeast Atlantic. NAFO Sci. Council Studies. 26:115-118.

Stenson, G. B., M. O. Hammill, J. Lawson and J.-F. Gosselin. 2006. Pup production of hooded seals, *Cystophora cristata*, in the northwest Atlantic. DFO Can. Sci. Advis. Sec. Res. Doc. 2006/067.

Stenson, G. B., R. A. Myers, I-H Ni and W. G. Warren. 1997. Pup production and population growth of hooded seals (*Cystophora cristata*) near Newfoundland, Canada. Can. J. Fish. Aquat. Sci. 54:209-216. Supplement 1.

Smith, T. G. and T. Taylor. 1977. Notes on marine mammal, fox and polar bear harvests in the Northwest Territories 1940 to 1972. Fisheries and Marine Service, Tech. Rep. No. 694.

Stewart, R. E. A., P. Richards, M. C. S. Kinglsey and J. J. Houston. 1986. Seals and sealing in Canada's northern and Arctic regions. Fish. Aquat. Sci. Tech. Rep. No. 1463.

Winters, G. H., and B. Bergflødt. 1978. Mortality and productivity of the Newfoundland hooded seal stock. ICNAF Res. Doc., No.91 , Serial No. N5307 , 6 p.

Table 1: Proportion of young of the year (0) and older (1+) seal killed that are assumed to have been recovered and included in the reported catches.

	Harvest Area			
	Canadian		Greenland	
	0	1+	0	1+
1952-1982	0.99	0.99	0.50	0.50
1983-1999	0.95	0.50	0.50	0.50

Table 2: Reported catches of hooded seals in the Northwest Atlantic. Shading indicates estimated values. Canadian catches from 1990-1996 were not assigned to age classes. With the exception of 1996, all were assumed to be 1+.

	Canada			Greenland			NW
	0	1+	Total	Norwegian	Greenland	Total	Atlantic
1945				3,275		3,275	3,275
1946	5,171	734	5,905	17,767		17,767	23,672
1947	1,851	2,784	4,635	16,080		16,080	20,715
1948	8,577	7,220	15,797	16,170		16,170	31,967
1949	5,021	891	5,912	1,494		1,494	7,406
1950	1,666	394	2,060	17,742		17,742	19,802
1951	10,461	2,948	13,409	47,607		47,607	61,016
1952	1,439	248	1,687	16,910		16,910	18,597
1953	3,716	1,850	5,566	2,907		2,907	8,473
1954	2,638	1,054	3,692	18,291	1,298	19,589	23,281
1955	3,956	1,549	5,505	10,230	1,315	11,545	17,050
1956	6,647	7,254	13,901	12,840	854	13,694	27,595
1957	109	72	181	21,425	1,207	22,632	22,813
1958	4,712	3,856	8,568	14,950	1,207	16,157	24,725
1959	4,216	611	4,827	6,480	1,506	7,986	12,813
1960	3,050	1,728	4,778	7,930	1,292	9,222	14,000
1961	2,272	319	2,591	0	1,822	1,822	4,413
1962	1,067	165	1,232	0	1,857	1,857	3,089
1963	4,632	1,662	6,294	0	2,019	2,019	8,313
1964	4,599	6,302	10,901	0	3,101	3,101	14,002
1965	2,869	1,327	4,196	0	2,130	2,130	6,326
1966	16,751	8,785	25,536	0	2,873	2,873	28,409
1967	8,380	6,440	14,820	0	2,336	2,336	17,156
1968	1,208	657	1,865	0	2,052	2,052	3,917
1969	8,821	9,522	18,343	0	2,232	2,232	20,575
1970	5,320	1,870	7,190	797	2,116	2,913	10,103
1971	8041	6,905	14,946	0	2,378	2,378	17,324
1972	6928	5,672	12,600	869	4,208	5,077	17,677
1973	4602	1,965	6,567	0	3,327	3,327	9,894
1974	5991	4,008	9,999	1,201	4,006	5,207	15,206
1975	7646	7,965	15,611	0	4,706	4,706	20,317
1976	6540	5,845	12,385	323	5,041	5,364	17,749
1977	8970	3,123	12,093	0	5,977	5,977	18,070
1978	7966	2,538	10,504	1,201	6,387	7,588	18,092
1979	11948	3,177	15,125		5,901	5,901	21,026
1980	11153	1,963	13,116		6,395	6,395	19,511
1981	10661	3,015	13,676		6,169	6,169	19,845
1982	7757	2,636	10,393		6,433	6,433	16,826
1983	0	128	128		5,476	5,476	5,604
1984	206	243	449		4,692	4,692	5,141
1985	220	564	784		6,877	6,877	7,661
1986	21	12	33		5,846	5,846	5,879

	Canada			Greenland			NW
	0	1+	Total	Norwegian	Greenland	Total	Atlantic
1987	1321	534	1,855		4,805	4,805	6,660
1988	828	80	908		**6,265**	6,265	7,173
1989	102	265	367		**6,493**	6,493	6,860
1990	41	689	730		**6,722**	6,722	7,452
1991	0	6,335	6,335		**6,950**	6,950	13,285
1992	35	179	214		**7,179**	7,179	7,393
1993	0	38	38		6,950	6,950	6,988
1994	19	202	221		8,108	8,108	8,329
1995	0	857	857		7,149	7,149	8,006
1996	22,847[1]	2,907	25,754		9,882	9,882	35,636
1997	0	7,058	7,058		7,433	7,433	14,491
1998	0	10,148	10,148		6,314	6,314	16,462
1999	0	201	201		3,170	3,170	3,371
2000	2	12	14		5,819	5,819	5,833
2001	0	140	140		6,259	6,259	6,399
2002	0	150	150		3,525	3,525	3,675
2003	0	151	151		6,307	6,307	6,458
2004	0	389	389		**6,397**	6,397	6,786
2005	0	20	20		**6,397**	6,397	6,417
2006	0	0	0		**6,397**	6,397	6,397

[1] Number of age group 0 estimated from reported illegal catches

Table 3: Major management measures implemented for hooded seals in Canadian waters (1960–2006).

Year	Management Measure
1964	Hunting of hooded seals banned in the Gulf area (below 50°N), effective 1965.
1966	ICNAF assumed responsibility for management advice for northwest Atlantic.
1968	Open season defined (12 March–15 April).
1974–1975	TAC set at 15,000 for Canadian waters. Opening and closing dates set (20 March–24 April).
1976	TAC held at 15,000 for Canadian waters. Opening delayed to 22 March. Shooting banned between 23:00 and 10:00 GMT from opening until 31 March and between 24:00 and 09:00 GMT thereafter (to limit loss of wounded animals).
1977	TAC maintained at 15,000 for Canadian waters. Shooting of animals in water prohibited (to reduce loss due to sinking). Number of adult females limited to 10% of total catch.
1978	TAC remained at 15,000 for Canadian waters. Limited number of adult females to 7.5% of total catch.
1979–1982	TAC maintained at 15,000. Catch of adult females reduced to 5% of total catch.
1983	TAC reduced to 12,000 for Canadian waters. Previous conservation measures retained.
1984–1990	TAC reduced to 2,340 for Canadian waters.
1987	Change in Seal Management Policy to prohibit the commercial hunting of bluebacks and hunting from large (>65 ft) vessels (effective 1988). Changes implemented by a condition of licence.
1991–1992	TAC increased to 15,000.
1992	First Seal Management Plan implemented.
1993	TAC reduced to 8,000. Seal Protection Regulations updated and incorporated in the Marine Mammal Regulations. The commercial sale of bluebacks prohibited under the Regulations.
1995	Personal sealing licences allowed (adult pelage only).
1998	TAC increased to 10,000
2000	Taking of bluebacks prohibited by condition of license.
2003	Implementation of Objective Based Fisheries Management. Hooded seals are considered to be 'Data Poor'.

Table 4: Proportional age composition of 1+ hooded seal catches in the Canadian commercial hunt 1946-2004. Proportions at age used for 1956-1982 are based on samples collected by DFO scientists on the Newfoundland whelping ground from 1979-82 (n = 893). The proportions at age for 1983-2006 are based upon catches from Newfoundland sealers for all months (n = 789).

Age	1946-1982	1983-2005
1	0.0022	0.2928
2	0.0000	0.0418
3	0.0000	0.0469
4	0.0717	0.0406
5	0.0873	0.0558
6	0.1299	0.0558
7	0.1254	0.0368
8	0.1086	0.0279
9	0.0750	0.0292
10	0.0717	0.0304
11	0.0817	0.0241
12	0.0538	0.0304
13	0.0314	0.0317
14	0.0426	0.0266
15	0.0190	0.0304
16	0.0157	0.0368
17	0.0146	0.0292
18	0.0235	0.0139
19	0.0090	0.0215
20	0.0078	0.0177
21	0.0056	0.0190
22	0.0067	0.0177
23	0.0034	0.0114
24	0.0034	0.0089
25+	0.0101	0.0228

Table 5: Estimated number of hooded seals, by age, caught at the Front and in the Gulf, 1946-2006. Reported catches have been adjusted for seals killed but not recovered.

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25 +	Total
1946	5,223	2	0	0	53	65	96	93	81	56	53	61	40	23	32	14	12	11	17	7	6	4	5	2	2	7	5,965
1947	1,870	6	0	0	202	246	365	353	305	211	202	230	151	88	120	54	44	41	66	25	22	16	19	9	9	28	4,682
1948	8,664	16	0	0	523	637	947	915	792	547	523	596	392	229	310	139	114	106	172	65	57	41	49	25	25	74	15,957
1949	5,072	2	0	0	65	79	117	113	98	68	65	74	48	28	38	17	14	13	21	8	7	5	6	3	3	9	5,972
1950	1,683	1	0	0	29	35	52	50	43	30	29	33	21	12	17	8	6	6	9	4	3	2	3	1	1	4	2,081
1951	10,567	7	0	0	213	260	387	373	323	223	213	243	160	93	127	57	47	43	70	27	23	17	20	10	10	30	13,544
1952	1,454	1	0	0	18	22	33	31	27	19	18	20	13	8	11	5	4	4	6	2	2	1	2	1	1	3	1,704
1953	3,754	4	0	0	134	163	243	234	203	140	134	153	100	59	80	36	29	27	44	17	15	10	13	6	6	19	5,622
1954	2,665	2	0	0	76	93	138	134	116	80	76	87	57	33	45	20	17	15	25	10	8	6	7	4	4	11	3,729
1955	3,996	4	0	0	112	137	203	196	170	117	112	128	84	49	67	30	25	23	37	14	12	9	11	5	5	16	5,561
1956	6,714	16	0	0	525	640	952	919	796	550	525	599	394	230	312	139	115	107	172	66	57	41	49	25	25	74	14,041
1957	110	0	0	0	5	6	9	9	8	5	5	6	4	2	3	1	1	1	2	1	1	0	0	0	0	1	183
1958	4,760	9	0	0	279	340	506	489	423	292	279	318	209	122	166	74	61	57	92	35	31	22	26	13	13	39	8,655
1959	4,259	1	0	0	44	54	80	77	67	46	44	50	33	19	26	12	10	9	15	6	5	3	4	2	2	6	4,876
1960	3,081	4	0	0	125	152	227	219	190	131	125	143	94	55	74	33	27	25	41	16	14	10	12	6	6	18	4,826
1961	2,295	1	0	0	23	28	42	40	35	24	23	26	17	10	14	6	5	5	8	3	3	2	2	1	1	3	2,617
1962	1,078	0	0	0	12	15	22	21	18	13	12	14	9	5	7	3	3	2	4	1	1	1	1	1	1	2	1,244
1963	4,679	4	0	0	120	147	218	211	182	126	120	137	90	53	71	32	26	24	39	15	13	9	11	6	6	17	6,358
1964	4,645	14	0	0	456	556	827	798	691	478	456	520	342	200	271	121	100	93	150	57	50	36	43	21	21	64	11,011
1965	2,898	3	0	0	96	117	174	168	146	101	96	110	72	42	57	26	21	20	32	12	11	8	9	5	5	14	4,238
1966	16,920	20	0	0	636	775	1,153	1,113	964	666	636	725	477	278	378	169	139	129	209	79	70	50	60	30	30	89	25,794
1967	8,465	15	0	0	466	568	845	816	707	488	466	532	350	204	277	124	102	95	153	58	51	36	44	22	22	66	14,970
1968	1,220	1	0	0	48	58	86	83	72	50	48	54	36	21	28	13	10	10	16	6	5	4	4	2	2	7	1,884
1969	8,910	22	0	0	689	840	1,249	1,206	1,045	722	689	786	517	302	409	183	151	140	226	86	75	54	65	32	32	97	18,528
1970	5,374	4	0	0	135	165	245	237	205	142	135	154	102	59	80	36	30	27	44	17	15	11	13	6	6	19	7,263
1971	8,122	16	0	0	500	609	906	875	758	523	500	570	375	219	297	133	109	102	164	62	55	39	47	23	23	70	15,097
1972	6,998	13	0	0	411	500	744	719	622	430	411	468	308	180	244	109	90	83	135	51	45	32	38	19	19	58	12,727
1973	4,648	4	0	0	142	173	258	249	216	149	142	162	107	62	84	38	31	29	47	18	16	11	13	7	7	20	6,633
1974	6,052	9	0	0	290	354	526	508	440	304	290	331	218	127	172	77	63	59	95	36	32	23	27	14	14	41	10,100

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25 +	Total
1975	7,723	18	0	0	577	703	1,045	1,009	874	604	577	658	432	252	342	153	126	117	189	72	63	45	54	27	27	81	15,769
1976	6,606	13	0	0	423	516	767	740	641	443	423	483	317	185	251	112	93	86	139	53	46	33	40	20	20	60	12,510
1977	9,061	7	0	0	226	276	410	396	343	237	226	258	170	99	134	60	49	46	74	28	25	18	21	11	11	32	12,215
1978	8,046	6	0	0	184	224	333	322	278	192	184	210	138	80	109	49	40	37	60	23	20	14	17	9	9	26	10,610
1979	12,069	7	0	0	230	280	417	402	349	241	230	262	172	101	137	61	50	47	75	29	25	18	22	11	11	32	15,278
1980	11,266	4	0	0	142	173	258	249	215	149	142	162	107	62	84	38	31	29	47	18	16	11	13	7	7	20	13,248
1981	10,769	7	0	0	218	266	396	382	331	228	218	249	164	95	130	58	48	44	72	27	24	17	20	10	10	31	13,814
1982	7,835	6	0	0	191	233	346	334	289	200	191	218	143	83	113	51	42	39	63	24	21	15	18	9	9	27	10,498
1983	0	75	11	12	10	14	14	9	7	7	8	6	8	8	7	8	9	7	4	6	5	5	5	3	2	6	256
1984	217	142	20	23	20	27	27	18	14	14	15	12	15	15	13	15	18	14	7	10	9	9	9	6	4	11	703
1985	232	330	47	53	46	63	63	41	31	33	34	27	34	36	30	34	41	33	16	24	20	21	20	13	10	26	1,360
1986	22	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	1	46
1987	1,391	313	45	50	43	60	60	39	30	31	32	26	32	34	28	32	39	31	15	23	19	20	19	12	9	24	2,459
1988	872	47	7	8	6	9	9	6	4	5	5	4	5	5	4	5	6	5	2	3	3	3	3	2	1	4	1,032
1989	107	155	22	25	21	30	30	19	15	15	16	13	16	17	14	16	19	15	7	11	9	10	9	6	5	12	637
1990	43	403	58	65	56	77	77	51	38	40	42	33	42	44	37	42	51	40	19	30	24	26	24	16	12	31	1,421
1991	0	3,709	530	594	514	707	707	466	353	369	385	305	385	401	337	385	466	369	177	273	225	241	225	145	112	289	12,670
1992	37	105	15	17	15	20	20	13	10	10	11	9	11	11	10	11	13	10	5	8	6	7	6	4	3	8	395
1993	0	22	3	4	3	4	4	3	2	2	2	2	2	2	2	2	3	2	1	2	1	1	1	1	1	2	76
1994	20	118	17	19	16	23	23	15	11	12	12	10	12	13	11	12	15	12	6	9	7	8	7	5	4	9	424
1995	0	502	72	80	70	96	96	63	48	50	52	41	52	54	46	52	63	50	24	37	30	33	30	20	15	39	1,714
1996	24,049	1,702	243	273	236	324	324	214	162	169	177	140	177	184	155	177	214	169	81	125	103	111	103	66	52	133	29,863
1997	0	4,133	590	662	573	787	787	519	394	411	429	340	429	447	376	429	519	411	197	304	250	268	250	161	125	322	14,116
1998	0	5,942	849	952	823	1,132	1,132	746	566	592	617	489	617	643	540	617	746	592	283	437	360	386	360	232	180	463	20,296
1999	0	118	17	19	16	22	22	15	11	12	12	10	12	13	11	12	15	12	6	9	7	8	7	5	4	9	402
2000	2	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	1	26
2001	0	82	12	13	11	16	16	10	8	8	9	7	9	9	7	9	10	8	4	6	5	5	5	3	2	6	280
2002	0	88	13	14	12	17	17	11	8	9	9	7	9	10	8	9	11	9	4	6	5	6	5	3	3	7	300
2003	0	88	13	14	12	17	17	11	8	9	9	7	9	10	8	9	11	9	4	7	5	6	5	3	3	7	302
2004	0	228	33	36	32	43	43	29	22	23	24	19	24	25	21	24	29	23	11	17	14	15	14	9	7	18	778
2005	0	12	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	1	40
2006	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 6: Proportional age composition of hooded seal catches taken by Norwegian hunters at the Denmark Strait moulting grounds.

	1955-60	1970	1972	1974	1976	1978
0	0.0161	0.0025	0.0012	0.0000	0.0000	0.0000
1	0.1078	0.1068	0.1387	0.1296	0.0891	0.1162
2	0.1134	0.1369	0.1131	0.1262	0.0759	0.1616
3	0.1418	0.1206	0.1049	0.1096	0.1287	0.1279
4	0.1267	0.0691	0.1084	0.0664	0.0924	0.1195
5	0.1087	0.1143	0.0734	0.0764	0.0858	0.0901
6	0.0813	0.0729	0.0746	0.0764	0.0759	0.0699
7	0.0577	0.0528	0.0723	0.0698	0.0429	0.0547
8	0.0444	0.0653	0.0478	0.0598	0.0759	0.0539
9	0.0340	0.0616	0.0490	0.0532	0.0528	0.0379
10	0.0198	0.0590	0.0548	0.0233	0.0462	0.0345
11	0.0208	0.0276	0.0350	0.0266	0.0264	0.0269
12	0.0236	0.0327	0.0385	0.0399	0.0330	0.0227
13	0.0180	0.0276	0.0256	0.0233	0.0297	0.0160
14	0.0274	0.0113	0.0210	0.0299	0.0264	0.0168
15	0.0104	0.0126	0.0117	0.0133	0.0231	0.0118
16	0.0057	0.0025	0.0082	0.0166	0.0099	0.0093
17	0.0076	0.0038	0.0058	0.0166	0.0264	0.0084
18	0.0132	0.0063	0.0012	0.0100	0.0231	0.0059
19	0.0066	0.0038	0.0058	0.0033	0.0066	0.0025
20	0.0028	0.0013	0.0023	0.0000	0.0165	0.0042
21	0.0019	0.0025	0.0000	0.0100	0.0033	0.0034
22	0.0019	0.0013	0.0035	0.0033	0.0000	0.0000
23	0.0009	0.0013	0.0000	0.0066	0.0033	0.0008
24	0.0028	0.0013	0.0000	0.0000	0.0033	0.0017
25+	0.0047	0.0025	0.0035	0.0100	0.0033	0.0034
Sample Size	1,058	796	858	301	303	1,188

Table 7: Estimated number of moulting hooded seals, by age, caught by Norwegian hunters in the Denmark Strait 1945-1978. Reported catches have been adjusted for seals killed but not recovered.

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25+	Total
1945	105	706	743	929	830	712	532	378	291	223	130	136	155	118	180	68	37	50	87	43	19	12	12	6	19	31	6,550
1946	571	3,829	4,030	5,038	4,501	3,862	2,888	2,049	1,579	1,209	705	739	840	638	974	369	202	269	470	235	101	67	67	34	101	168	35,534
1947	517	3,465	3,648	4,560	4,073	3,496	2,614	1,854	1,429	1,094	638	669	760	578	882	334	182	243	426	213	91	61	61	30	91	152	32,160
1948	520	3,485	3,668	4,585	4,096	3,515	2,629	1,865	1,437	1,100	642	672	764	581	886	336	183	245	428	214	92	61	61	31	92	153	32,340
1949	48	322	339	424	378	325	243	172	133	102	59	62	71	54	82	31	17	23	40	20	8	6	6	3	8	14	2,988
1950	570	3,823	4,025	5,031	4,494	3,857	2,884	2,046	1,576	1,207	704	738	838	637	973	369	201	268	470	235	101	67	67	34	101	168	35,484
1951	1,530	10,259	10,799	13,499	12,059	10,349	7,740	5,490	4,230	3,240	1,890	1,980	2,250	1,710	2,610	990	540	720	1,260	630	270	180	180	90	270	450	95,214
1952	543	3,644	3,836	4,795	4,283	3,676	2,749	1,950	1,502	1,151	671	703	799	607	927	352	192	256	449	224	96	64	64	32	96	160	33,820
1953	93	626	659	824	736	632	473	335	258	198	115	121	137	104	159	60	33	44	77	38	16	11	11	5	16	27	5,814
1954	588	3,942	4,149	5,186	4,633	3,976	2,974	2,109	1,625	1,245	726	761	864	657	1,003	380	207	277	484	242	104	69	69	35	104	173	36,582
1955	329	2,205	2,321	2,901	2,591	2,224	1,663	1,180	909	696	406	425	483	367	561	213	116	155	271	135	58	39	39	19	58	97	20,460
1956	413	2,767	2,913	3,641	3,252	2,791	2,087	1,481	1,141	874	510	534	607	461	704	267	146	194	340	170	73	49	49	24	73	121	25,680
1957	689	4,617	4,860	6,075	5,427	4,658	3,483	2,471	1,904	1,458	851	891	1,013	770	1,175	446	243	324	567	284	122	81	81	41	122	203	42,850
1958	480	3,222	3,391	4,239	3,787	3,250	2,430	1,724	1,328	1,017	593	622	707	537	820	311	170	226	396	198	85	57	57	28	85	141	29,900
1959	208	1,396	1,470	1,837	1,641	1,409	1,053	747	576	441	257	269	306	233	355	135	73	98	171	86	37	24	24	12	37	61	12,960
1960	255	1,709	1,799	2,249	2,009	1,724	1,289	914	705	540	315	330	375	285	435	165	90	120	210	105	45	30	30	15	45	75	15,860
1961	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1964	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1968	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	4	170	218	192	110	182	116	84	104	98	94	44	52	44	18	20	4	6	10	6	2	4	2	2	2	4	1,594
1971	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	2	241	196	182	188	128	130	126	83	85	95	61	67	45	36	20	14	10	2	10	4	0	6	0	0	6	1,738
1973	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25+	Total
1974	0	311	303	263	160	184	184	168	144	128	56	64	96	56	72	32	40	40	24	8	8	24	8	16	0	24	2,402
1975	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	58	49	83	60	55	49	28	49	34	30	17	21	19	17	15	6	17	15	4	11	2	0	2	2	2	646
1977	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	279	388	307	287	216	168	131	129	91	83	65	55	38	40	28	22	29	14	6	10	8	0	2	4	8	2,402

Table 8: Proportional age composition of hooded seal catches in Greenland.

Age	1954-84	1985-2006	1954-2006
0	0.0216	0.3194	0.0634
1	0.0606	0.1710	0.0761
2	0.0977	0.0942	0.0972
3	0.1082	0.0593	0.1013
4	0.1190	0.0611	0.1109
5	0.1017	0.0541	0.0950
6	0.0809	0.0279	0.0734
7	0.0663	0.0384	0.0624
8	0.0544	0.0279	0.0507
9	0.0478	0.0227	0.0443
10	0.0376	0.0175	0.0348
11	0.0342	0.0227	0.0326
12	0.0259	0.0262	0.0259
13	0.0268	0.0070	0.0240
14	0.0265	0.0017	0.0230
15	0.0185	0.0035	0.0164
16	0.0185	0.0070	0.0169
17	0.0080	0.0070	0.0078
18	0.0083	0.0052	0.0078
19	0.0071	0.0087	0.0073
20	0.0074	0.0017	0.0066
21	0.0028	0.0000	0.0024
22	0.0040	0.0035	0.0039
23	0.0040	0.0035	0.0039
24	0.0020	0.0000	0.0017
25	0.0103	0.0087	0.0100
Sample Size	3,512	573	4,085

Table 9: Estimated number of hooded seals, by age, caught in Greenland, 1954-2006, apply a single age structure for the period 1954-1984 and a different age structure for the period 1985-2006. Reported catches have been adjusted for seals killed but not recovered.

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25+	Total
1954	56	157	254	281	309	264	210	172	141	124	98	89	67	69	69	48	48	21	21	18	19	7	10	10	5	27	2,596
1955	57	160	257	285	313	267	213	174	143	126	99	90	68	70	70	49	49	21	22	19	19	7	10	10	5	27	2,630
1956	37	104	167	185	203	174	138	113	93	82	64	58	44	46	45	32	32	14	14	12	13	5	7	7	3	18	1,708
1957	52	146	236	261	287	245	195	160	131	115	91	82	63	65	64	45	45	19	20	17	18	7	10	10	5	25	2,414
1958	52	146	236	261	287	245	195	160	131	115	91	82	63	65	64	45	45	19	20	17	18	7	10	10	5	25	2,414
1959	65	183	294	326	358	306	244	200	164	144	113	103	78	81	80	56	56	24	25	21	22	9	12	12	6	31	3,012
1960	56	157	252	280	308	263	209	171	141	124	97	88	67	69	68	48	48	21	21	18	19	7	10	10	5	26	2,584
1961	79	221	356	394	434	370	295	242	198	174	137	125	94	98	96	67	67	29	30	26	27	10	15	15	7	37	3,644
1962	80	225	363	402	442	378	300	246	202	178	140	127	96	99	98	69	69	30	31	26	27	11	15	15	7	38	3,714
1963	87	245	394	437	481	410	327	268	220	193	152	138	105	108	107	75	75	32	33	29	30	11	16	16	8	41	4,038
1964	134	376	606	671	738	630	502	411	337	297	233	212	161	166	164	115	115	49	51	44	46	18	25	25	12	64	6,202
1965	92	258	416	461	507	433	344	283	232	204	160	146	110	114	113	79	79	34	35	30	32	12	17	17	8	44	4,260
1966	124	348	561	622	684	584	465	381	312	275	216	196	149	154	152	106	106	46	47	41	43	16	23	23	11	59	5,746
1967	101	283	456	506	556	475	378	310	254	223	176	160	121	125	124	86	86	37	39	33	35	13	19	19	9	48	4,672
1968	89	249	401	444	488	417	332	272	223	196	154	140	106	110	109	76	76	33	34	29	30	12	16	16	8	42	4,104
1969	97	271	436	483	531	454	361	296	243	214	168	153	116	119	118	83	83	36	37	32	33	13	18	18	9	46	4,464
1970	92	257	413	458	504	430	342	281	230	202	159	145	110	113	112	78	78	34	35	30	31	12	17	17	8	43	4,232
1971	103	288	464	515	566	483	385	316	259	228	179	163	123	127	126	88	88	38	39	34	35	14	19	19	9	49	4,756
1972	182	510	822	911	1,002	855	681	558	458	403	316	288	218	225	223	156	156	67	69	60	62	24	34	34	17	86	8,416
1973	144	404	650	720	792	676	538	441	362	318	250	227	172	178	176	123	123	53	55	47	49	19	27	27	13	68	6,654
1974	173	486	782	867	954	814	648	532	436	383	301	274	208	214	212	148	148	64	66	57	59	23	32	32	16	82	8,012
1975	204	571	919	1,018	1,120	957	761	624	512	450	354	322	244	252	249	174	174	75	78	67	70	27	38	38	19	96	9,412
1976	218	611	985	1,091	1,200	1,025	815	669	548	482	379	344	261	270	267	187	187	80	83	72	75	29	40	40	20	103	10,082
1977	259	725	1,167	1,293	1,423	1,215	967	793	650	572	449	408	310	320	317	221	221	95	99	85	88	34	48	48	24	123	11,954
1978	276	775	1,248	1,382	1,520	1,298	1,033	847	695	611	480	436	331	342	338	236	236	102	105	91	95	36	51	51	25	131	12,774
1979	255	716	1,153	1,277	1,405	1,200	954	783	642	565	444	403	306	316	313	218	218	94	97	84	87	34	47	47	24	121	11,802
1980	277	776	1,249	1,384	1,522	1,300	1,034	849	696	612	481	437	331	342	339	237	237	102	106	91	95	36	51	51	25	131	12,790
1981	267	748	1,205	1,335	1,468	1,254	998	819	671	590	464	422	320	330	327	228	228	98	102	88	91	35	49	49	25	126	12,338
1982	278	780	1,257	1,392	1,531	1,308	1,040	854	700	615	484	440	333	344	341	238	238	103	106	92	95	37	51	51	26	132	12,866
1983	237	664	1,070	1,185	1,304	1,113	886	727	596	524	412	374	284	293	290	203	203	87	90	78	81	31	44	44	22	112	10,952

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25+	Total
1984	203	569	916	1,015	1,117	954	759	623	510	449	353	321	243	251	248	174	174	75	77	67	69	27	37	37	19	96	9,384
1985	4,393	2,352	1,296	816	840	744	384	528	384	312	240	312	360	96	24	48	96	96	72	120	24	0	48	48	0	120	13,754
1986	3,921	2,100	1,157	728	750	664	343	471	343	279	214	279	321	86	21	43	86	86	64	107	21	0	43	43	0	107	12,277
1987	3,223	1,726	951	599	616	546	282	387	282	229	176	229	264	70	18	35	70	70	53	88	18	0	35	35	0	88	10,091
1988	4,202	2,250	1,240	781	804	712	367	505	367	298	230	298	344	92	23	46	92	92	69	115	23	0	46	46	0	115	13,156
1989	4,355	2,332	1,285	809	833	738	381	524	381	309	238	309	357	95	24	48	95	95	71	119	24	0	48	48	0	119	13,636
1990	4,508	2,414	1,330	838	862	764	394	542	394	320	246	320	370	99	25	49	99	99	74	123	25	0	49	49	0	123	14,116
1991	4,661	2,496	1,375	866	892	790	408	560	408	331	255	331	382	102	25	51	102	102	76	127	25	0	51	51	0	127	14,596
1992	4,815	2,578	1,421	895	921	816	421	579	421	342	263	342	395	105	26	53	105	105	79	132	26	0	53	53	0	132	15,075
1993	4,661	2,496	1,375	866	891	790	408	560	408	331	255	331	382	102	25	51	102	102	76	127	25	0	51	51	0	127	14,595
1994	5,438	2,912	1,605	1,010	1,040	921	475	654	475	386	297	386	446	119	30	59	119	119	89	149	30	0	59	59	0	149	17,027
1995	4,795	2,568	1,415	891	917	812	419	576	419	341	262	341	393	105	26	52	105	105	79	131	26	0	52	52	0	131	15,013
1996	6,628	3,549	1,956	1,231	1,268	1,123	579	797	579	471	362	471	543	145	36	72	145	145	109	181	36	0	72	72	0	181	20,752
1997	4,985	2,670	1,471	926	953	844	436	599	436	354	272	354	409	109	27	54	109	109	82	136	27	0	54	54	0	136	15,609
1998	4,235	2,268	1,250	787	810	717	370	509	370	301	231	301	347	93	23	46	93	93	69	116	23	0	46	46	0	116	13,259
1999	2,126	1,139	627	395	407	360	186	256	186	151	116	151	174	46	12	23	46	46	35	58	12	0	23	23	0	58	6,657
2000	3,903	2,090	1,152	725	746	661	341	469	341	277	213	277	320	85	21	43	85	85	64	107	21	0	43	43	0	107	12,220
2001	4,198	2,248	1,239	780	803	711	367	505	367	298	229	298	344	92	23	46	92	92	69	115	23	0	46	46	0	115	13,144
2002	2,364	1,266	698	439	452	400	207	284	207	168	129	168	194	52	13	26	52	52	39	65	13	0	26	26	0	65	7,403
2003	4,230	2,265	1,248	786	809	717	370	509	370	300	231	300	347	92	23	46	92	92	69	116	23	0	46	46	0	116	13,245
2004	4,290	2,297	1,266	797	821	727	375	516	375	305	234	305	352	94	23	47	94	94	70	117	23	0	47	47	0	117	13,433
2005	4,290	2,297	1,266	797	821	727	375	516	375	305	234	305	352	94	23	47	94	94	70	117	23	0	47	47	0	117	13,433
2006	4,290	2,297	1,266	797	821	727	375	516	375	305	234	305	352	94	23	47	94	94	70	117	23	0	47	47	0	117	13,433

Table 10: Estimated number of hooded seals, by age, caught in Greenland, 1954-2006, apply a single age structure for the entire period 1954-2006. Reported catches have been adjusted for seals killed but not recovered.

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	2	25	Total
1954	165	198	252	263	288	247	191	162	132	115	90	85	67	62	60	43	44	20	20	19	17	6	10	10	4	26	2,596
1955	167	200	256	267	292	250	193	164	133	117	91	86	68	63	61	43	44	21	21	19	17	6	10	10	5	26	2,630
1956	108	130	166	173	189	162	125	107	87	76	59	56	44	41	39	28	29	13	13	13	11	4	7	7	3	17	1,708
1957	153	184	235	245	268	229	177	151	122	107	84	79	63	58	56	40	41	19	19	18	16	6	9	9	4	24	2,414
1958	153	184	235	245	268	229	177	151	122	10[illegible]	84	79	63	58	56	40	41	19	19	18	16	6	9	9	4	24	2,414
1959	191	229	293	305	334	286	221	188	153	133	105	98	78	72	69	49	51	24	24	22	20	7	12	12	5	30	3,012
1960	164	197	251	262	287	245	190	161	131	114	90	84	67	62	59	42	44	20	20	19	17	6	10	10	4	26	2,584
1961	231	277	354	369	404	346	268	227	185	161	127	119	95	87	84	60	62	29	29	27	24	9	14	14	6	37	3,644
1962	235	283	361	376	412	353	273	232	188	165	129	121	96	89	85	61	63	29	29	27	25	9	15	15	6	37	3,714
1963	256	307	392	409	448	384	297	252	205	179	140	131	105	97	93	66	68	32	32	30	27	10	16	16	7	41	4,038
1964	393	472	603	629	688	589	455	387	314	275	216	202	161	149	143	102	105	49	49	46	41	15	24	24	11	62	6,202
1965	270	324	414	432	472	405	313	266	216	189	148	139	111	102	98	70	72	33	33	31	28	10	17	17	7	43	4,260
1966	364	437	558	582	637	546	422	359	291	255	200	187	149	138	132	94	97	45	45	42	38	14	23	23	10	58	5,746
1967	296	356	454	473	518	444	343	292	237	207	162	152	121	112	108	77	79	37	37	34	31	11	18	18	8	47	4,672
1968	260	312	399	416	455	390	301	256	208	182	143	134	106	98	94	67	69	32	32	30	27	10	16	16	7	41	4,104
1969	283	340	434	452	495	424	328	279	226	198	155	145	116	107	103	73	75	35	35	33	30	11	17	17	8	45	4,464
1970	268	322	411	429	469	402	311	264	214	188	147	138	110	102	97	69	71	33	33	31	28	10	17	17	7	42	4,232
1971	302	362	462	482	527	452	349	297	241	211	165	155	123	114	109	78	80	37	37	35	31	12	19	19	8	48	4,756
1972	534	641	818	853	933	799	618	525	426	373	293	274	218	202	194	138	142	66	66	62	56	21	33	33	14	84	8,416
1973	422	507	647	674	738	632	489	415	337	295	231	217	173	160	153	109	112	52	52	49	44	16	26	26	11	67	6,654
1974	508	610	779	812	888	761	588	500	406	355	279	261	208	192	184	131	135	63	63	59	53	20	31	31	14	80	8,012
1975	597	717	915	954	1,044	894	691	588	477	417	327	306	244	226	217	154	159	74	74	69	62	23	37	37	16	94	9,412
1976	639	768	980	1,022	1,118	958	740	629	511	447	350	328	262	242	232	165	170	79	79	74	67	25	39	39	17	101	10,082
1977	758	910	1,162	1,211	1,326	1,135	878	746	606	530	416	389	310	287	275	196	202	94	94	88	79	29	47	47	20	120	11,954
1978	810	973	1,241	1,295	1,417	1,213	938	797	647	566	444	416	331	306	294	210	216	100	100	94	84	31	50	50	22	128	12,774
1979	748	899	1,147	1,196	1,309	1,121	867	737	598	523	410	384	306	283	272	194	199	92	92	87	78	29	46	46	20	118	11,802
1980	811	974	1,243	1,296	1,418	1,215	939	798	648	567	445	416	332	307	294	210	216	100	100	94	85	31	50	50	22	128	12,790
1981	782	939	1,199	1,250	1,368	1,172	906	770	625	547	429	[illegible]	320	296	284	202	208	97	97	91	82	30	48	48	21	124	12,338
1982	816	980	1,250	1,304	1,427	1,222	945	803	652	570	447	419	334	309	296	211	217	101	101	94	85	31	50	50	22	129	12,866
1983	694	834	1,064	1,110	1,215	1,040	804	684	555	485	381	357	284	263	252	180	185	86	86	80	72	27	43	43	19	110	10,952
1984	595	714	912	951	1,041	891	689	586	476	416	326	306	244	225	216	154	159	74	74	69	62	23	37	37	16	94	9,384

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	2	25	Total
1985	872	1,047	1,337	1,394	1,525	1,306	1,010	859	697	609	478	448	357	330	316	226	232	108	108	101	91	34	54	54	24	138	13,754
1986	778	935	1,193	1,244	1,361	1,166	902	766	622	544	427	400	319	295	282	201	207	96	96	90	81	30	48	48	21	123	12,277
1987	640	768	981	1,023	1,119	958	741	630	511	447	351	329	262	242	232	165	170	79	79	74	67	25	40	40	17	101	10,091
1988	834	1,002	1,279	1,333	1,459	1,250	966	821	667	583	457	428	341	316	303	216	222	103	103	97	87	32	52	52	23	132	13,156
1989	865	1,038	1,325	1,382	1,512	1,295	1,001	851	691	604	474	444	354	327	314	224	230	107	107	100	90	33	53	53	23	137	13,636
1990	895	1,075	1,372	1,431	1,565	1,341	1,037	881	715	625	491	460	366	339	325	232	238	111	111	104	93	35	55	55	24	142	14,116
1991	925	1,111	1,418	1,479	1,619	1,386	1,072	911	740	647	507	475	379	350	336	239	247	114	114	107	96	36	57	57	25	146	14,596
1992	956	1,148	1,465	1,528	1,672	1,432	1,107	941	764	668	524	491	391	362	347	247	255	118	118	111	100	37	59	59	26	151	15,075
1993	925	1,111	1,418	1,479	1,618	1,386	1,072	911	740	647	507	475	379	350	336	239	247	114	114	107	96	36	57	57	25	146	14,595
1994	1,080	1,296	1,655	1,726	1,888	1,617	1,250	1,063	863	754	592	554	442	408	392	279	288	133	133	125	113	42	67	67	29	171	17,027
1995	952	1,143	1,459	1,522	1,665	1,426	1,103	937	761	665	522	489	390	360	345	246	254	118	118	110	99	37	59	59	26	151	15,013
1996	1,316	1,580	2,017	2,103	2,301	1,971	1,524	1,295	1,052	919	721	676	538	498	478	340	351	163	163	152	137	51	81	81	36	208	20,752
1997	990	1,188	1,517	1,582	1,731	1,483	1,146	974	791	692	543	508	405	374	359	256	264	122	122	115	103	38	61	61	27	157	15,609
1998	841	1,009	1,289	1,344	1,470	1,259	974	828	672	588	461	432	344	318	305	217	224	104	104	97	88	32	52	52	23	133	13,259
1999	422	507	647	675	738	632	489	[illegible]	337	295	231	217	173	160	153	109	112	52	52	49	44	16	26	26	11	67	6,657
2000	775	930	1,188	1,238	1,355	1,161	897	763	619	541	425	398	317	293	281	200	206	96	96	90	81	30	48	48	21	123	12,220
2001	833	1,001	1,277	1,332	1,458	1,248	965	820	666	582	457	428	341	315	302	216	222	103	103	97	87	32	51	51	23	132	13,144
2002	469	564	719	750	821	703	544	462	375	328	257	241	192	178	170	121	125	58	58	54	49	18	29	29	13	74	7,403
2003	840	1,008	1,287	1,342	1,469	1,258	973	827	671	587	460	431	344	318	305	217	224	104	104	97	88	32	52	52	23	133	13,245
2004	852	1,023	1,305	1,361	1,490	1,276	987	839	681	595	467	437	349	322	309	220	227	105	105	99	89	33	53	53	23	135	13,433
2005	852	1,023	1,305	1,361	1,490	1,276	987	839	681	595	467	437	349	322	309	220	227	105	105	99	89	33	53	53	23	135	13,433
2006	852	1,023	1,305	1,361	1,490	1,276	987	839	681	595	467	437	349	322	309	220	227	105	105	99	89	33	53	53	23	135	13,433

Table 11: Total hunt-induced mortality of hooded seals in the northwest Atlantic

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25+	Total
1954	3,309	4,102	4,403	5,467	5,019	4,333	3,322	2,415	1,882	1,449	900	936	969	760	1,117	449	272	313	531	270	131	83	87	49	112	210	42,907
1955	4,382	2,368	2,577	3,185	3,017	2,628	2,079	1,550	1,222	939	617	643	636	487	697	291	189	198	329	168	90	55	60	35	69	139	28,651
1956	7,164	2,887	3,079	3,826	3,981	3,605	3,177	2,513	2,030	1,505	1,099	1,191	1,045	757	1,061	438	292	314	526	248	143	94	105	56	101	213	41,429
1957	851	4,764	5,096	6,336	5,720	4,909	3,688	2,640	2,043	1,579	946	979	1,079	836	1,242	492	289	344	589	301	140	88	91	50	127	228	45,447
1958	5,292	3,377	3,627	4,500	4,353	3,836	3,132	2,373	1,883	1,425	963	1,023	978	724	1,049	430	275	302	507	250	133	85	92	51	103	205	40,969
1959	4,532	1,581	1,764	2,163	2,044	1,769	1,377	1,024	807	631	415	423	417	333	461	202	139	131	211	113	64	37	41	26	45	98	20,848
1960	3,392	1,870	2,051	2,528	2,441	2,139	1,725	1,305	1,035	794	537	561	536	409	577	246	165	166	272	139	78	47	52	31	56	119	23,270
1961	2,374	222	356	394	457	399	337	282	233	198	160	151	112	108	110	74	72	34	38	29	30	12	17	16	8	41	6,261
1962	1,158	226	363	402	454	392	322	267	220	190	152	141	105	105	105	72	71	32	35	28	29	12	16	15	8	40	4,958
1963	4,766	249	394	437	601	557	545	478	402	319	272	275	195	161	178	107	101	57	73	44	43	21	27	22	14	58	10,396
1964	4,780	390	606	671	1,194	1,186	1,328	1,210	1,029	774	689	732	503	366	435	236	215	142	201	101	96	53	67	46	34	128	17,213
1965	2,990	261	416	461	603	550	519	451	377	304	256	255	182	156	170	104	100	53	67	42	42	20	26	21	13	57	8,498
1966	17,045	368	561	622	1,320	1,359	1,617	1,494	1,276	941	852	922	626	432	530	275	245	175	256	120	112	66	83	53	41	148	31,540
1967	8,566	298	456	506	1,022	1,043	1,223	1,126	961	712	642	691	471	329	401	210	188	132	192	92	86	50	62	40	31	111	19,642
1968	1,309	250	401	444	536	475	418	356	295	246	202	194	142	131	137	89	86	42	49	35	36	15	21	19	10	49	5,988
1969	9,007	292	436	483	1,221	1,294	1,610	1,502	1,288	935	857	939	633	421	527	266	233	176	263	118	108	67	82	50	41	143	22,992
1970	5,469	431	632	650	749	777	704	602	539	442	389	343	263	217	210	134	112	67	89	53	48	27	32	25	17	66	13,089
1971	8,225	304	464	515	1,066	1,093	1,291	1,190	1,016	751	679	733	498	346	423	221	197	139	203	96	90	53	66	42	33	119	19,853
1972	7,182	764	1,018	1,093	1,601	1,484	1,554	1,403	1,163	918	822	817	593	449	503	285	260	161	206	121	111	56	78	53	36	150	22,881
1973	4,792	408	650	720	934	850	796	690	577	467	392	390	279	240	261	161	154	82	102	65	65	30	40	33	20	88	13,287
1974	6,225	806	1,086	1,130	1,403	1,352	1,457	1,207	1,019	815	647	669	521	397	456	257	252	163	185	101	91	69	67	61	30	147	20,514
1975	7,927	589	919	1,018	1,697	1,659	1,806	1,633	1,386	1,054	930	979	676	504	592	327	300	192	267	139	133	72	92	65	46	178	25,181
1976	6,824	682	1,034	1,174	1,683	1,596	1,631	1,477	1,239	959	832	844	600	474	535	314	286	183	237	129	132	64	80	62	42	165	23,238
1977	9,319	732	1,167	1,293	1,649	1,491	1,376	1,189	993	809	675	666	479	419	451	281	271	141	173	113	113	52	69	58	34	154	24,169
1978	8,323	1,059	1,636	1,689	1,991	1,739	1,534	1,300	1,103	894	747	711	523	461	488	314	299	159	180	120	125	59	68	62	38	165	25,786
1979	12,324	723	1,153	1,277	1,635	1,480	1,371	1,185	990	805	674	666	478	417	449	280	269	141	173	113	113	52	69	58	34	153	27,080
1980	11,542	780	1,249	1,384	1,664	1,473	1,292	1,097	911	761	623	599	438	405	423	274	268	131	152	109	110	48	64	58	32	151	26,038
1981	11,036	755	1,205	1,335	1,687	1,520	1,393	1,201	1,002	819	682	671	483	426	456	286	276	143	173	115	115	52	70	59	35	157	26,152
1982	8,114	786	1,257	1,392	1,722	1,540	1,386	1,188	989	815	674	657	476	428	454	289	280	141	169	115	116	52	69	60	35	159	23,364
1983	237	739	1,080	1,197	1,314	1,128	900	736	603	531	419	380	292	301	297	210	212	95	94	83	86	36	48	47	24	118	11,208
1984	420	711	937	1,038	1,137	981	786	640	524	463	367	332	258	267	261	188	192	89	84	77	78	36	46	43	23	107	10,087
1985	4,624	2,683	1,343	869	886	807	447	570	416	345	274	339	394	132	54	82	137	129	88	144	44	21	68	61	10	146	15,114
1986	3,943	2,107	1,158	730	751	666	344	472	343	279	215	279	322	86	22	44	87	86	65	108	22	0	43	43	0	108	12,323

Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25+	Total
1987	4,613	2,038	996	649	660	605	341	427	312	260	299	255	297	104	16	68	110	102	68	111	37	20	54	47	9	112	12,549
1988	5,073	2,297	1,247	798	810	721	376	511	372	303	234	302	349	97	27	51	99	97	71	118	26	3	49	48	1	118	14,188
1989	4,462	2,487	1,307	834	854	767	410	543	396	325	254	323	373	112	38	64	115	111	79	130	33	10	57	54	5	131	14,273
1990	4,551	2,818	1,388	902	918	841	471	593	433	360	291	353	411	142	63	91	149	139	93	153	49	26	74	65	12	155	15,537
1991	4,661	6,206	3,905	1,460	1,405	1,496	1,114	1,076	761	700	640	636	767	503	363	436	568	471	253	400	250	241	276	195	112	416	27,266
1992	4,851	2,683	1,436	911	935	836	441	592	431	352	274	351	406	117	36	64	118	116	84	139	33	7	59	57	3	140	15,470
1993	4,661	2,518	1,379	870	895	794	412	563	410	333	257	333	384	104	27	53	105	104	77	129	27	1	52	52	1	129	14,671
1994	5,458	3,030	1,622	1,029	1,056	944	498	669	487	398	309	396	458	132	40	72	134	131	95	157	37	8	67	64	4	158	17,451
1995	4,795	3,069	1,487	971	987	908	515	639	467	391	314	382	445	159	72	105	168	155	102	168	57	33	83	72	15	170	16,727
1996	30,677	5,251	2,199	1,504	1,503	1,447	904	1,010	742	640	539	611	720	329	191	249	354	314	196	306	139	111	176	139	52	314	50,616
1997	4,985	6,802	2,061	1,588	1,526	1,632	1,223	1,118	829	766	702	694	838	556	403	484	628	529	279	440	278	268	305	216	125	458	29,725
1998	4,235	8,210	2,098	1,710	1,633	1,849	1,302	1,255	936	892	849	790	964	736	563	664	839	684	352	553	383	386	406	278	180	579	33,555
1999	2,126	1,256	644	414	423	183	208	270	197	163	128	161	186	59	22	35	61	58	40	67	19	8	30	28	4	67	7,059
2000	3,905	2,097	1,153	726	747	662	343	470	342	278	214	278	321	86	22	43	86	86	64	107	22	0	43	43	0	107	12,246
2001	4,198	2,330	1,250	793	814	727	383	515	375	306	238	305	353	101	30	54	102	100	73	121	28	5	51	49	2	121	13,424
2002	2,364	1,354	710	453	464	417	223	295	215	177	138	175	203	61	21	35	63	60	43	71	18	6	31	29	3	71	7,703
2003	4,230	2,354	1,261	800	821	733	387	520	378	309	240	308	356	102	31	55	104	101	74	122	28	6	52	50	3	122	13,547
2004	4,290	2,525	1,298	834	852	770	418	544	397	327	258	325	375	118	44	71	122	116	83	134	37	15	61	56	7	135	14,211
2005	4,290	2,309	1,268	799	822	729	377	517	376	306	236	306	353	95	25	48	95	95	71	118	24	1	48	47	0	118	13,473
2006	4,290	2,297	1,266	797	821	727	375	516	375	305	234	305	352	94	23	47	94	94	70	117	23	0	47	47	0	117	13,433

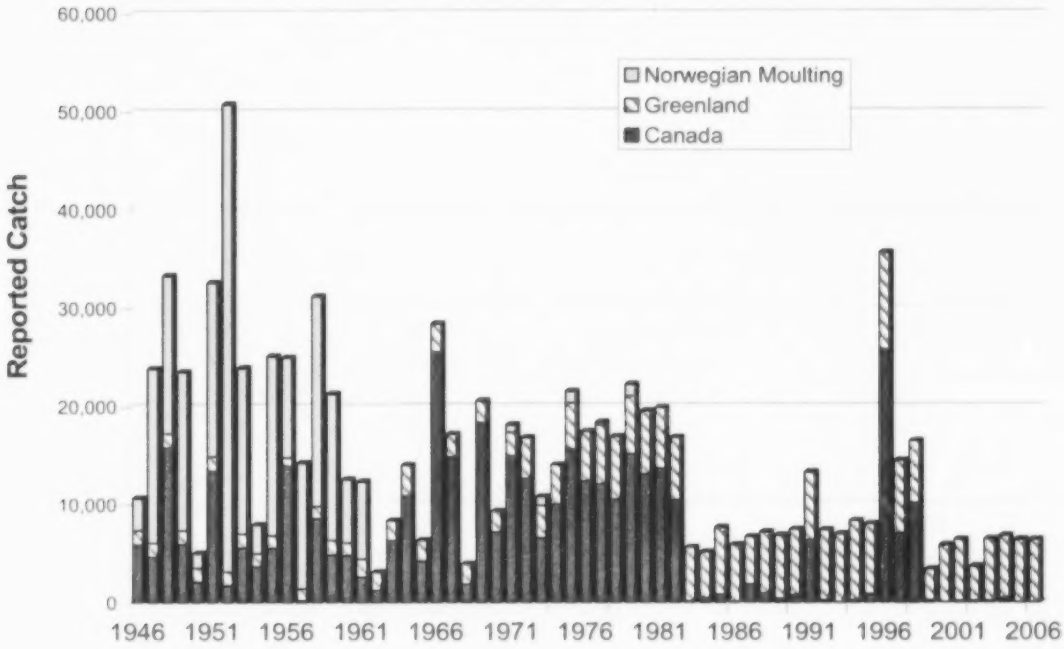

Fig 1. Total reported catches of hooded seals in the Northwest Atlantic 1954-2006.

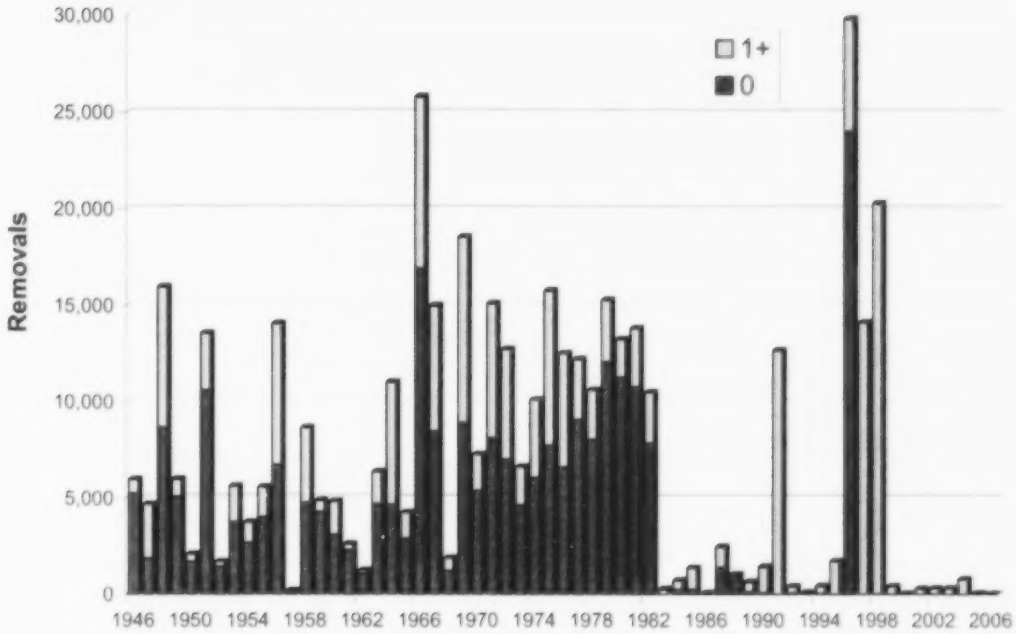

Fig 2. Removals of Northwest Atlantic hooded seals in southern Canadian areas 1946-2004, adjusted for seals killed but not recovered.

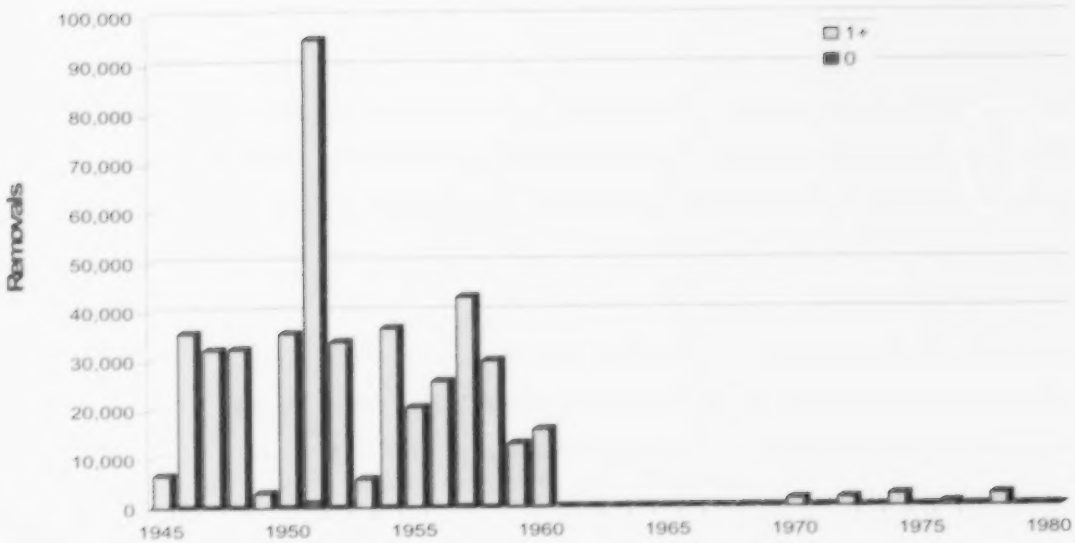

Fig. 3. Removals of moulting Northwest Atlantic hooded seals by Norway in the Denmark Strait, 1945-1978, adjusted for seals killed but not recovered.

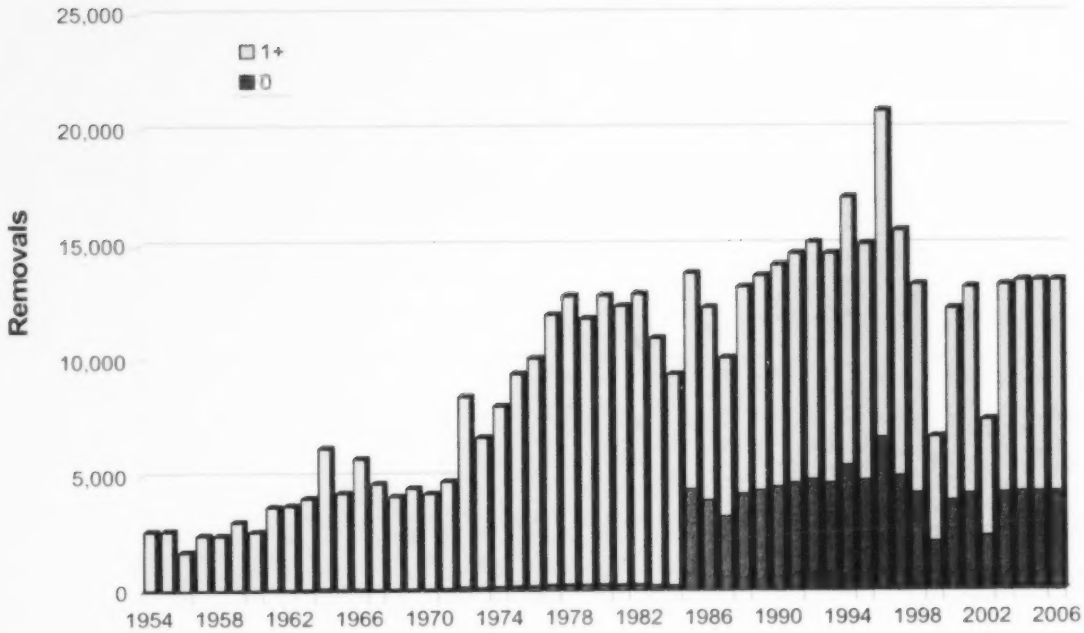

Fig. 4. Removals of Northwest Atlantic hooded seals in Greenland 1954-2004, adjusted for seals killed but not landed. One age structure was applied for the period 1954-1984 and a different age structure for the period 1985-2006. Values for 1988-92 and 2004-2006 are estimated (see text).

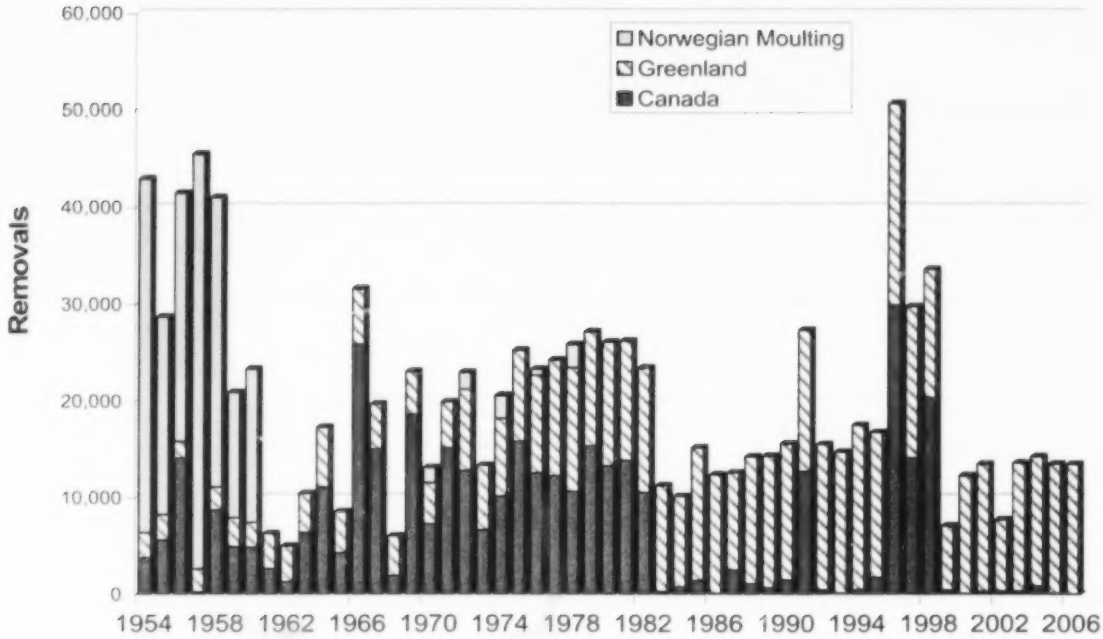

Fig. 5. Total removals of Northwest Atlantic hooded seals,1954-2006, adjusted for seals killed but not recovered..